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ABSTRACT

This paper describes a study designed to provide information regarding children's perceptions of their own physiological responses associated with feelings of apprehension. A second goal was to compare children's self reports with their reports on parent emotional responses and also with parents' reports on their own stress-related physiological symptoms. A group of 47 boys and 51 girls, seven to ten years of age, were individually presented with a story of a hypothetical child's confrontation with an anxiety-arousing situation. Each child was asked to imagine being in a similar situation and to rate the degree to which each of ten common physiological responses to stress would be experienced. An adaptation of the Somatic Perception Questionnaire (Children's SPQ) was the measuring instrument used. The child was also asked to imagine his/her parent(s) in a similar situation and to report what physical symptoms the parent might experience. One or both parents of approximately half the children completed an adult SPQ in reaction to a story psychologically similar to that used with the children. Children's responses revealed no relationship between response and sex or age (in contrast to sex differences noted in the adult responses). Symptoms most often reported by children for themselves were increased heart rate, restlessness and awareness of heart activity. Children's reports on expected parent symptoms differed significantly from their reports on their own experience. In general, the rank order of symptoms based on frequency of response was similar for child and adult responses. (BF)

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"A FROG IN MY KNEECAP": CHILDREN'S PERCEIVED PHYSIOLOGICAL RESPONSES TO STRESS

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Psychophysiological research has largely focused on the study of infancy adulthood. Comparatively few experimental studies have measured the influence of psychological factors on physiological functioning in children. Even fewer studies are even peripherally related to the problem of children's perceptions of emotions. Some (e.g., Gilber, 1969) have focused on awareness of emotion without reference to its physiological correlates. Others (e.g., Wolman, Lewis, and King, 1971; 1972) operating within a psychoanalytic framework have investigated physiological localization of emotion, but have assumed that locating the source of emotion in the head or brain (an "encephalization" effect) is indicative of a more mature response than is physiological accuracy.

The present study was designed to provide some information regarding children's perceptions of their physiological responses associated with the experience of apprehension. A second goal was the comparison of children's self-reports with the self-reports of their parents.

METHOD

Names of children between the ages of seven and ten years were obtained through the State College, Pennsylvania, area Cub Scouts and Brownies. One of three female interviewers conducted a short individual interview with each of 47 boys (mean age = 8.4 years) and 51 girls (mean age = 7.9 years). Most interviews were conducted in the children's homes.

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Several stories which revolved around a hypothetical child's confrontation of an anxiety-arousing situation had earlier been pretested and the one most consistently judged as stressful by children six and one-half to nine years of age was used for all subsequent interviewing. The story was illustrated and involved a child who had to tell the school principal about accidentally breaking a school window.

After the child heard the story, the child was asked what he/she thought the child in the story felt about the imminent confrontation with the principal, and then what he/she would feel in that situation. The object of this questioning was to establish whether the child had a clear concept of "anxious" and whether he/she could differentiate this feeling from other conflicting emotions likely to arise in such a situation (e.g., sadness or anger).[1] The child was then asked to imagine himself/herself in that situation and to rate the degree to which he/she would experience each of ten common physiological responses to stress: (1) flushed face; (2) tense stomach; (3) sweaty hands; (4) dry mouth; (5) cold hands and feet; (6) restlessness; (7) sweaty body; (8) increased heart rate; (9) urge to urinate; (10) awareness of heart activity. The child was also asked if any additional symptoms would be experienced. This Children's Somatic Perception Questionnaire (CSPQ) was adapted from the Somatic Perception Questionnaire (SPQ; Stern and Higgins, 1969). The child rated each stress response on a three point scale: None; Some; A lot. With the completion of the CSPQ the child was asked to imagine his/her parent(s) in a similar situation and to report what physical symptoms the child thought the parent would experience.

Parents of 62 children were later contacted and asked to complete the adult version of SPQ. Because the CSPQ was based on a standard stress situation,

the SPQ was similarly modified in order to insure comparability of child and parent responses. Independent judges had chosen a story involving an innocent person accused of shoplifting as most psychologically similar to the child's. One or both parents of 26 boys and 21 girls completed this modififed SPQ.

RESULTS

Children's responses X^2 analysis of each of the CSPQ items revealed no relationships (alpha = .05) between response and sex or age. Data for ages and sexes were therefore combined for further analysis.

The symptom most often reported as experienced to the greatest degree was increased heart rate. Over half of the responses to this item indicated that the symptom would be experienced "A lot." Over one-third of the responses to two other items indicated that the symptoms would be experienced "A lot": restlessness and awareness of heart activity. When response categories "Some" and "A lot" were combined, the most frequently reported symptoms were: increased heart rate (87%); restlessness (84%); and awareness of heart activity (77%).

The final question of the CSPQ asks for any additional symptoms that might be experienced. Of the 95 children for whom data were complete, 40 reported additional symptoms. The great majority of these symptoms were identical to or could be subsumed under one or more of the CSPQ items, e.g., "shakiness"; "sweaty and chilly." The only novel symptom that occurred with noticeable frequency was piloerection (17.5% of those reporting additional symptoms), e.g., "tingling in arms and legs"; "my hair would get kind of stiff." Other reported symptoms were actually a more graphic description of the overall experience of apprehension: "My head feels like it's fuzzing up inside, my legs feel funny...foamy, like there was a frog in my kneecap" (male, age nine).

The children's reports of what they believed their parents would experience showed that some children were skeptical as to whether their parents could experience such feelings. About 14% of their responses indicated the belief that parents would experience no apprehension in this or any situation, while 17% of their responses indicated an inability to predict specific symptoms or made reference to general anxiousness. Although a majority of the children's responses indicated specific symptoms believed to be experienced by their parents (64%), the most frequently named symptoms, flushed face and sweaty hands, were not those most often reported by the children as the ones they themselves would experience.

Parents' responses In general, the rank order of SPQ symptoms based on frequency of response was similar for the samples of children and adults. The major difference between child and adult symptom order was in the rank of the symptom "face feels hot or flushed." This symptom was the most frequently reported by both men (89%) and women (95%), but the fourth least frequently reported by children (54%). The overall frequency with which individual symptoms were reported was somewhat greater in adults than in children.

Parent-child comparisons Weighted kappa (Cohen, 1968) was used to determine the degree of agreement between parent-child pairs and between parent-random child pairs. The five point rating scale used in the SPQ was reduced to three categories to correspond to the rating scale used by the children. Fathers' agreement with either son or daughter did not exceed the agreement found between fathers and randomly paired children. Significantly greater agreement between mother-son and mother-daughter pairs than between mothers and randomly paired children was observed ($z = 1.52$, $p < .07$ and $z = 3.02$, $p < .01$, respectively).

DISCUSSION

The CSPQ proved to be an effective method of assessing seven- to ten-year-old children's perceptions of physiological responses to stress. The story within which the interview questions were framed elicited universal interest, and even those children who attend schools with a relatively informal environment could identify with the dilemma of the child who had to tell the principal about an accidental transgression.

The children were generally quite cooperative, and felt comfortable with the story-telling situation. That the children understood and attended to the task was evident from their behavior. The children were frankly perplexed when asked about symptoms they themselves did not experience, and some even questioned whether people, in fact, could experience such a symptom. By the same token, children who experienced relatively uncommon symptoms would often reply with an expression that conveyed the question: "How did you know that I feel this way?" There was no evidence, however, of response bias. The first two items on the CSPQ pertain to presence of a flushed face and tense stomach and these were not among the items most frequently reported. If any response bias was evident, it was in the sample of parents. The first symptom which appears on the SPQ was the symptom most frequently reported by adults.

Additional evidence of the validity of the children's responses came from their reports of what they believed their parents would feel in a similar situation. On the whole, the children did not merely reiterate the symptoms they themselves would experience. One would expect this to occur if they were concerned with providing "appropriate" responses. None of the children expressed an inability to assess his/her own symptomology, but over 30% of their responses regarding their parents' symptoms showed a reluctance to name specific symptoms,

a denial that their parents could experience such symptoms, or general reference to parental anxiousness. One could thus infer that the children's reports of symptoms were based on a true assessment of their own experience. Children's ability to recognize stress-related physical symptoms was also apparent in their references to symptoms not appearing on the CSPQ, e.g., piloerection, and their general descriptions of the physical feelings associated with apprehension.

Stern and Higgins (1969) reported significant sex and age differences in responses to the SPQ in a large sample of college students, their parents, and same-sexed sib closest in age to the student. They found that females reported a significantly higher incidence of five of the ten SPQ symptoms than males. Such sex differences were not observed in the responses of the children included in the present study, but were noted in the responses of the adults. (Women reported a higher frequency of most symptoms than men.) These results may be due to the greater willingness of boys than adult males to report physical symptoms associated with stress, or perhaps a greater tendency for girls to observe and report such symptoms as they grow older. The lack of sex differences in the responses of children may also be due to the absence of real physiological differences which appear later in development, possibly at puberty.

Stern and Higgins (1969) also reported that younger people (college students and their sibs) reported a higher incidence of most symptoms than their parents. No such age-related difference was observed in the present study. Children reported a generally lower frequency of all symptoms, except, restlessness, than adults.

In general, the rank order of SPQ symptoms based on frequency of response was similar for the children and adults. In Stern and Higgin's college

sample, significant agreement of SPQ ratings was found for children and the same-sexed parent. In contrast, the present study revealed a relationship between reports of mothers, but not fathers, and reports of children of both sexes. The discrepancy between these results and those of the earlier study may be due to differences in the method of quantifying degree of agreement or indicate true developmental differences. Further examination of agreement between parent-child SPQ responses of a larger sample are necessary.

Results of this study have implications for the study of developmental psychophysiology. Indications of the validity of the children's self-reports suggest that it is worthwhile to study children's ability to control physiological responses using operant techniques. Comparatively few cross-sectional studies of this sort have been published. Another important finding is the importance of restlessness as a stress-related symptom. Children reported that restlessness frequency accompanied their feelings of apprehension. Such a finding indicates that restlessness, which is most often treated as pure artifact, is possibly a major component of the child's stress response and could therefore serve as a behavioral measure of stress level.

FOOTNOTE

[1]CSPQ data for three girls were omitted from analysis. One of the children failed to discriminate among feelings of sadness, anger, and apprehension. Environmental distractions hampered the interview for two children. Results are thus based on the responses of 47 boys and 48 girls.

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